

WHAT IS CLAIMED IS

1. A method for fabricating a high resistive thin film resistor comprising the following steps:

providing a substrate having an isolation region and an active region formed thereon;

5 forming a polysilicon layer above the substrate;

forming a diffusion barrier layer above the polysilicon layer;

lightly ion implanting the polysilicon layer;

performing a high temperature annealing on the substrate;

removing a portion of the diffusion barrier layer and the

10 polysilicon layer to form a high resistive thin film resistor structure above the isolation region;

depositing a conformal insulation layer above the substrate to cover the high resistive thin film resistor; and

15 etching back the insulation layer to form a spacer on the sidewalls of the high-resistive thin film resistor.

2. The method of claim 1, wherein the isolation region includes a shallow trench isolation region.

3. The method of claim 1, wherein the method for forming the polysilicon layer includes a low-pressure chemical vapor deposition method.

20 4. The method of claim 1, wherein the thickness of the polysilicon layer is about 2000 Angstrom.

5. The method of claim 1, wherein the step of forming the diffusion barrier layer comprises forming a silicon dioxide layer.

6. The method of claim 5, wherein the method of forming the silicon

dioxide layer includes a chemical vapor deposition method.

7. The method of claim 5, wherein the thickness of the silicon dioxide layer is between 100 Angstroms and 500 Angstroms.

8. A high resistive thin film resistor structure comprising:

5 a substrate having an isolation region and an active region;

a patterned, lightly doped polysilicon layer located above the isolation region;

a diffusion barrier layer located above the lightly doped polysilicon layer; and

a spacer located on the sidewalls of the lightly doped polysilicon layer and the barrier diffusion layer.

10 9. The structure of claim 8, wherein the isolation region includes a shallow trench isolation structure.

10. The structure of claim 8, wherein the thickness of the polysilicon layer is about 2000 Angstrom.

11. The structure of claim 8, wherein the diffusion barrier layer includes a
15 silicon dioxide layer.

12. The structure of claim 11, wherein the silicon dioxide has a thickness of between 100 and 500 Angstrom.

The structure of claim 8, wherein the spacer includes a silicon dioxide.